

REMARKS

This Amendment and Response to Non-Final Office Action is being submitted in response to the non-final Office Action mailed September 8, 2005. Claims 1-17 are pending in the Application.

The Specification stands objected to because the Abstract of the Disclosure exceeds the maximum allowable 150-word limit. Claim 17 is withdrawn from further consideration, as being drawn to a non-elected species. Claims 1-10 and 12-15 stand rejected under 35 U.S.C. 102(e) as being anticipated by Xiao et al. (US Publication 2002/0101636). Finally, Claims 11 and 16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Xiao et al. (US Publication 2002/0101636) in view of Moon et al. (US Publication 2003/0184843).

In response to the above rejections, the Specification has been amended to replace the Abstract of the Disclosure with a paragraph that does not exceed the maximum allowable 150-word limit. Claim 17 has been withdrawn. Claims 1-9 and 12-14 have been amended to further clarify the subject matter which Applicant regards as the invention and to correct minor inconsistencies. These amendments are fully supported in the Specification, Drawings, and Claims of the Application and no new matter has been added. Based upon the amendments, reconsideration of the Application is respectfully requested in view of the following remarks.

Specification:

The Specification stands objected to because the Abstract of the Disclosure exceeds the maximum allowable 150-word limit.

In response to this objection, Applicant requests that Examiner replace the Abstract of the Disclosure with the following paragraph:

An architecture is proposed for an optical node in a wavelength division multiplexed network. The optical node may be an optical add/drop node. Conventional add/drop nodes utilize a broadcast or blocking architecture. In a broadcast architecture, a copy of an optical signal is dropped to a drop path of a node while another copy continues on a through path. Thus, channels that occupy a specific portion of wavelengths (or spectrum) prior to the node are not available for use subsequent to the add/drop connectivity. In a blocking architecture, at least the through path (and often the drop path) is spectrally filtered. This permits wavelength reuse for add/drops in subsequent portions of the network. Disclosed is an optical node architecture that enables starting with a low cost approach, such as broadcast, but includes connections to permit 'in-service' upgrade to a more capable architecture. Increasing spectral reuse is enabled through the architecture.

Rejection of Claims 1-10 and 12-15 Under 35 U.S.C. 102(e) – Xiao et al.:

Claims 1-10 and 12-15 stand rejected under 35 U.S.C. 102(e) as being anticipated by Xiao et al. (US Publication 2002/0101636). Specifically, in regard to Claim 1, Examiner states that Xiao et al. disclose an optical node apparatus (Figure 3-6), comprising: a through path coupler (Figure 6, element 626) having at least first and second outputs (corresponding to output ports 646 and 648), said through path coupler configured to optically connect to an input port (elements 644 and 650) for receiving an input optical signal and configured to provide a first through optical signal on the first output and a second through optical signal on the second output (Figure 6); a first optical filter (652a) for optically connecting to the first output port and configured to filter the first through optical signal; and a selective connector (optical switch 630) configured for enabling selective optical connection to an output of said first optical filter, wherein the

second output port is configured to accept a second optical filter (652b) and said selective connector is configured to switch optical connection to an output of said second optical filter without any substantial disruption to an operation of said optical node apparatus (page 5, paragraphs 40 and 41). Examiner further states that Claims 2-10 and 12, which depend from Claim 1, are also disclosed in Xiao et al.

Also, in regard to Claim 13, Examiner states that Xiao et al. disclose a fiber optic transmission system (Figures 3-6), comprising: a plurality of transmitters (such as 624, Figure 6, repeated for every dashed rectangle 550 in Figure 5) configured to transmit input signals; a multiplexer (element 302.1, Figure 3) optically connected to a fiber optic line (Figure 3), said multiplexer configured to multiplex signals from said plurality of transmitters to the fiber optic line; a demultiplexer (element 302.2, Figure 3) optically connected to the fiber optic line, said demultiplexer configured to demultiplex optical signals from the fiber optic line (Figure 3); a plurality of receivers (such as 626, Figure 6, repeated for every dashed rectangle 550 in Figure 5) configured to receive the demultiplexed signals from the demultiplexer; and one or more optical add/drop nodes of claim 3 (Figures 3 and 4, elements 304 and Figures 5 and 6, elements 550) optically placed between said multiplexer and said demultiplexer (Figure 3). Examiner further states that Claims 14 and 15, which depend from Claim 1, are also disclosed in Xiao et al.

In response to this rejection, Claim 1 has been amended to recite:

1. An optical node apparatus, comprising: a through path coupler having at least first and second outputs, the through path coupler configured to optically connect to an input port for receiving an input optical signal and configured to provide a first through optical signal on the first output and a second through optical signal on the second output; a first optical filter for optically connecting to the first output port and configured to filter the first through optical signal; and a selective connector configured for enabling selective optical connection to an output of the first optical filter; wherein the second output port is configured to accept a second optical filter and the selective connector is configured to switch optical connection to an output of the second optical

filter without any substantial disruption to an operation of the optical node apparatus.; *wherein the optical node apparatus is reconfigurable while in-service and comprises connections to permit an in-service upgrade from a broadcast architecture to a spectrally blocking architecture, permitting spectral wavelength reuse in subsequent portions of a network; and wherein the optical node apparatus comprises connections to permit in-service maintenance.*

This amendment is fully supported throughout the Specification. Specifically, in paragraphs 3 through 8 Applicant describes the easily upgradeable path to switch between a broadcast architecture and a blocking architecture as well as a strategy for recovering previously inaccessible capacity, all without service interruptions. Additionally, the spectral reuse concept is illustrated in Figures 4 and 5 and articulated in the Specification specifically beginning in paragraph 38.

Xiao et al. disclose a self-adjusting add-drop multiplexer which monitors the power in a drop signal and attenuates the power in an add signal to match the power in express wave division multiplexed channels. Examiner asserts this is equivalent to the present invention, a reconfigurable optical node with distributed spectral filtering.

Applicant submits, however, that the Xiao et al. invention is not equivalent because the present invention provides for an optical node apparatus that is reconfigurable while in-service and provides connections to permit an in-service upgrade from a broadcast architecture to a spectrally blocking architecture, permitting spectral wavelength reuse in subsequent portions of a network and that provides connections to permit in-service maintenance. Xiao et al. do not disclose in-service upgrades, in-service maintenance, or spectral reuse. Rather, Xiao et al. disclose a self-adjusting add-drop multiplexer which monitors the power in a drop signal and attenuates the power in an add signal to match the power in express wave division multiplexed channels. As disclosed in paragraph 5, Xiao et al. seek to overcome the “unequal power characteristic” which arises from the power of added channel comprising a power level that is different from the power of an express channel. Xiao et al. state, “This unequal-power characteristic

does not impose any negative impact to the early local (e.g., "metropolitan" or "metro") multi-channel OADM systems wherein no optical amplifiers are used. However, the trend of late is to widely deploy amplifiers in such metro OADM systems in order to stretch the link distance and reach more customers. If channels in such an optical network have differing power levels, the weak signals could quickly dissipate after passing through a chain of amplifiers, due to the gain competition of the amplifiers. Therefore, the use of conventional OADM apparatus within a metro optical network also comprising optical amplifiers presents some problems." The Xiao et al. invention, as disclosed, enables ring selection intelligence, monitors power, as ascertained from monitoring to the signals from two optical taps, and performs the functions of minimum and maximum power intelligence and power matching.

Although many of the same optical components known in the art are present in both Xiao et al. and the present invention, the order and manner in which they are used and the purpose for which they are used are clearly different and distinguishable.

Specifically in regard to Claim 1, Examiner states that Xiao et al. disclose "first and second outputs" in Figure 6, elements 646 and 648. Applicant respectfully asserts that Examiner, in all likelihood, meant elements 648 and 650, not 646 and 648, as element 646 is disclosed by Xiao et al. as an *input* port (paragraph 39). Nonetheless, what Xiao et al. disclose as output ports, elements 648 and 650, are output ports to the OADM's, elements 504 and 508 in Figure 6, or the overall switching assembly 550. Applicant, however, by stating "first and second outputs" in Claim 1 is referring to signal output ports as illustrated in elements 110a and 110b immediately following the through path coupler 108 in Figure 1. A wavelength traveling through one of the first or second outputs 110a or 110b next proceeds directly to either a first optical filter 112 or a second optical filter 114 in the present invention. On the contrary, in Xiao et al. the wavelengths exiting the optical coupler 626 next proceed to variable optical attenuators 636 and 637 in Figure 6 to match the power of the add signal being added to ring networks via lines 610a

and 610b (paragraph 43) before proceeding to an optical tap 640 or 654, providing known portions of signal power to a controller 618, and then next proceeding to a beam combiner 654a or 654b. The present invention does not disclose the use of a variable optical attenuator or an optical tap in that specific location, optically connected between a through path coupler and an optical filter, as do Xiao et al. Applicant does disclose the optional use of a variable optical attenuator (VOA) 124 (paragraph 29 and Claim 3); however, when a VOA is used it is placed in line immediately following either the first optical filter or the second optical filter. This differs from the placement disclosed in Xiao et al.

Additionally in regard to Claim 1, Examiner states that Xiao et al. disclose “a first optical filter” in element 652a in Figure 6. In the present invention the first optical filter initially may be a patchcord which allows for direct optical pass through of the first through optical signal, or it may be a simple optical filter to perform rudimentary filtering (paragraph 23). This use of a patchcord or a simple optical filter is not disclosed in Xiao et al.

Additionally, the elements of Xiao et al. from which Examiner states are equivalent to the first and second optical filters 112 and 114 of the present invention are components within optical add drop multiplexers (OADMs) 504 and 508 (Xiao et al. paragraph 39). Xiao et al. state that these OADMs 504, 508 must include at least one beam separator 652a, 652b and at least one beam combiner 654a, 654b (paragraph 39). Since a beam combiner and a beam separator are each in effect an optical filter, Xiao et al. are using two optical filters, consecutively in order, in each OADM. The present invention, on the other hand, uses a single optical filter, or even a patchcord, at the output ports at the end of each through path coupler.

Additionally in regard to Claim 1, Examiner states that Xiao et al. disclose a “selective connector” in the optical switch 630 in Figure 6. Applicant respectfully asserts

that the selective connector 116 need not be an optical switch. It may of course be an optical switch. Paragraph 24 and Claim 4 of the present invention disclose this.

Claims 2-12 are dependent claims either directly or ultimately dependent on Claim 1. Based on the same unique and novel features of the present invention as described above, namely that, as amended, Claims 1, has unique and patentable novel features, precisely that the claim provides an optical node apparatus that is reconfigurable and/or maintainable while in-service, permitting an in-service upgrade from a broadcast architecture to a spectrally blocking architecture and permitting spectral wavelength reuse in subsequent portions of a network, it is respectfully asserted that these dependent claims are now in condition for allowance.

Also in response to this rejection, Claim 13 has been amended to recite:

13. A fiber optic transmission system, comprising:
 - a plurality of transmitters configured to transmit input signals;
 - a multiplexer optically connected to a fiber optic line, said multiplexer configured to multiplex signals from the plurality of transmitters to the fiber optic line;
 - a demultiplexer optically connected to the fiber optic line, the demultiplexer configured to demultiplex optical signals from the fiber optic line;
 - a plurality of receivers configured to receive the demultiplexed signals from the demultiplexer; and
 - one or more optical add/drop nodes of claim 3 optically placed between the multiplexer and the demultiplexer;

wherein an optical node apparatus within the fiber optic transmission system is reconfigurable while in-service and comprises connections to permit an in-service upgrade from a broadcast architecture to a spectrally blocking architecture, permitting spectral wavelength reuse in subsequent portions of a network; and

wherein an optical node apparatus within the fiber optic transmission system comprises connections to permit in-service maintenance.

This amendment is fully supported throughout the Specification. Specifically, in paragraphs 3 through 8 Applicant describes the easily upgradeable path to switch between a broadcast architecture and a blocking architecture as well as a strategy for recovering previously inaccessible capacity, all without service interruptions. Additionally, the spectral reuse concept is illustrated in Figures 4 and 5 and articulated in the Specification specifically beginning in paragraph 38.

Claims 14-16 are dependent claims either directly or ultimately dependent on Claim 13. Based on the same unique and novel features of the present invention as described above, namely that, as amended, Claims 13, has unique and patentable novel features, it is respectfully asserted that these dependent claims are now in condition for allowance.

The differences between the invention of Xiao et al. and the invention of the present Application is now made explicit in amended Claim 1 and Claim 13. Therefore, Applicant submits that the rejection of Claims 1-10 and 12-15 under 35 U.S.C. 102(e) as being anticipated by Xiao et al. has now been overcome and respectfully requests that this rejection be withdrawn.

Rejection of Claims 11 and 16 Under 35 U.S.C. 103(a) - Xiao et al.:

Claims 11 and 16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Xiao et al. (US Publication 2002/0101636) in view of Moon et al. (US Publication 2003/0184843). Specifically, Examiner states that regarding claims 11 and 16, Xiao teaches the limitations of the base claims 9 and 14, respectively. Examiner states that although Xiao et al. do not teach that the spectral blocking filter is a reconfigurable blocking filter, Moon et al., teach a reconfigurable blocking filter (Figures 1-3, 6-11, 17-24 and 27-29, abstract, page 1, paragraph 3, and page 11, claim 4). Examiner states that it would have been obvious to one of ordinary skill in the art at the time of the invention

to include the reconfigurable blocking filter of Moon in the optical node apparatus (fiber transmission system) of Xiao. The motivation would have been to selectively delete individual channels within the signal (Moon, page 1, paragraph 3 and Xiao, page 1, paragraph 6).

The above arguments with respect to Xiao et al. apply with equal force here, and these deficiencies are not remedied by Moon et al.

Therefore, Applicant submits that the rejection of Claims 11 and 16 under 35 U.S.C. 103(a) as being unpatentable over Xiao et al. in view of Moon et al. has now been overcome and respectfully requests that this rejection be withdrawn.

CONCLUSION

Applicant would like to thank Examiner for the attention and consideration accorded the present Application. Should Examiner determine that any further action is necessary to place the Application in condition for allowance, Examiner is encouraged to contact undersigned Counsel at the telephone number, facsimile number, address, or email address provided below. It is not believed that any fees for additional claims, extensions of time, or the like are required beyond those that may otherwise be indicated in the documents accompanying this paper. However, if such additional fees are required, Examiner is encouraged to notify undersigned Counsel at Examiner's earliest convenience.

Respectfully submitted,

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